



Technology Case Study: Delaware Statewide Radio System

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Security

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The State of Delaware's statewide radio system is a standards-based, regionally-shared system. Known as the Emergency Communications System, the statewide system supports more than 14,000 subscribers from 247 different municipal, county, State, Federal, and non-governmental agencies, processing more than 115,000 interoperable communications calls on a routine day. It also enables interoperability with critical regional partners in Maryland, New Jersey, and the Philadelphia Urban Area.

Current Operating Environment

Many jurisdictions consider Delaware's existing statewide emergency communications capabilities to be a prime example of interoperability. For Delaware and its key regional partners, interoperable communications is used on a daily basis through a statewide 800MHz public safety land mobile radio (LMR) communications system that serves emergency responders at the State and local levels.

The system consists of three subsystems, each capable of operating independently if necessary. The subsystems are located throughout the State with each of its three counties being connected to one subsystem. The three subsystems are linked by a statewide digital microwave system that provides connectivity to each of the fixed network sites.

Within the system, agencies can utilize more than 778 agency-specific channels or "talkgroups" which are shared through interagency agreements. Agencies can also communicate using mutual aid talkgroups that are pre-programmed into every radio.

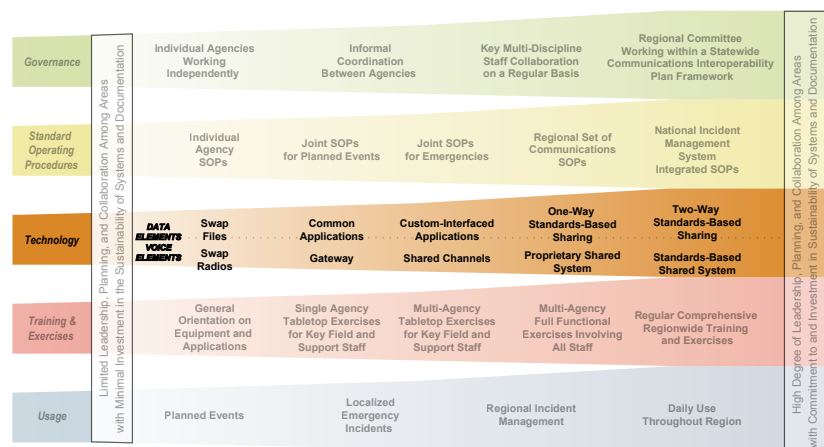
To augment the primary radio system, Delaware installed five National Public Safety Planning Advisory Committee 800MHz channels throughout the State. In an effort to ensure interoperable communications with supporting agencies that are not on the statewide system and/or do not possess 800MHz radios, Delaware has developed the following solutions:

Technology

The Interoperability Continuum is designed to assist emergency response agencies and policy makers to plan and implement interoperability solutions for data and voice communications. This tool identifies five critical success elements that must be addressed to achieve a sophisticated interoperability solution. The third critical success element is technology. Technology—both voice and data—should meet the needs of practitioners on the frontlines and should address regional needs, existing infrastructures, and sustainability. In order to achieve the most sophisticated level of interoperability in the Technology lane in the area of voice elements, standards based, regional shared systems should be in place and available.



Interoperability Continuum



1. The State maintains several caches of standby radios to support interoperable communications for public safety personnel during large-scale incidents.
2. Gateway systems interconnect channels of different systems (whether on different bands or modes), allowing emergency responders to use their agency's radios and channels to communicate with other agencies using different radios and channels.
3. The State shares private system keys with surrounding jurisdictions, which is a secure way to allow radios from outside agencies to operate on Delaware's system. This agreement allows Delaware's radios to work on systems outside of the State and allows radios from surrounding jurisdictions to operate on Delaware's system.

Need for a Long-term Strategy

In many ways, however, the State's success in building an interoperable system created additional challenges. These include the Federal Communications Commission's (FCC) narrowbanding mandate, the need for more data communications, and increased demand, all of which required the State to consider how best to add new users without exceeding maximum capacity. A lack of available 800MHz frequencies in the crowded mid-Atlantic region prevents the State from adding other agencies, such as the Department of Corrections, Public Works, and schools, onto the system. Cross patching of channels, sharing of radio caches, and a vast array of radio communications equipment, makes the use of the various systems cumbersome, complicated, inefficient to manage, and costly to maintain.

Recognizing that it would be extremely difficult and impractical to stop all growth in the system, Delaware determined it needed to either halt the addition of new non-traditional users on the 800MHz network, or off-load some users onto a complementary, interoperable network.

Fortunately, the State has a long history of successful multi-jurisdiction and multi-discipline governance structures to support these types of strategic decisions. An initial working group representing various agencies and jurisdictions, now consolidated under the auspices of the State Interoperability Executive

Council, were pulled together from across the State

to identify and propose a solution to the looming network constraints.

After considerable investigation, the group chose a standards-based 700MHz system that could be shared by all, and would include a gateway to the existing 800MHz statewide system. In 2007, the State applied for and was awarded funds under the Public Safety Interoperable Communications Grant Program to begin deploying the new system. From a business and procurement perspective, this solution also provides the State with strategic flexibility in the future. As the State's future requirements evolve, Delaware will have at least two technology path options (700MHz and 800MHz), and will not be limited to a single vendor. As multiple vendor technologies can support any future upgrades, Delaware will benefit from a competitive procurement environment.

Future Operating Environment

Delaware's long-term strategy provides a high-level approach to transition the current agency-based public safety LMR systems to a standards-based, frequency-independent, and multiple subsystems technology architecture. The strategy calls for a Project 25 system that will operate in the 700MHz and 800MHz frequency bands—expanding the number of channels available to the current system and minimizing system capacity constraints. The infrastructure was developed in support of the current 800MHz system, as well as the current upgrade, and will support the development of the new 700MHz public safety LMR system in the State.

Phase I of the plan will provide 95 percent statewide coverage to voice and data devices, and will support gateways to Delaware's 800MHz system and to 700/800MHz systems in surrounding jurisdictions, such as Pennsylvania's Southeastern Counter Terrorism Task Force Network, Maryland's Eastern Shore Interoperability Network, and Pennsylvania's statewide radio network. It will be possible for some users on the 800MHz system to transition onto the new 700MHz system to reduce 800MHz system loading. This will allow other agencies, who have portable and in-building mission requirements, to move to the 800MHz system and ensure continued use by current users of the 800 MHz system.

Additionally, in order to keep the system current with FCC's requirements, the 700MHz deployment contract requires the vendor to upgrade the network—at no

additional cost—when the 700MHz frequencies are required to meet new narrowbanding mandates.

Conclusion

Managing this expanded system will be challenging, but Delaware has the governance structures, technology planning, and capabilities in place to sustain and even increase the number of users that have access to daily interoperable communications throughout the region. Leveraging Delaware's lessons learned, other States and localities can implement technology systems that support daily interoperability. Regardless of whether other jurisdictions follow Delaware's approach to voice technology or create their own, thorough technology planning and coordination with regional partners will ensure widespread interoperable communications.

This case study is part of the Office of Emergency Communication's (OEC) 10-Year Anniversary of 9/11 project. OEC will publish six case studies aligning to the Interoperability Continuum and detailing milestones in the areas of governance, standard operating procedures, technology, training and exercises, and usage. Each study will represent the strongest solution from a State, region, city, or town across the Nation and is geared toward the emergency response community.